A Surgical Services Management System - Toward Improved Communications and Operational Efficiency

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INTRODUCTION

Today all health centers are subjected to severe financial, social, academic, political, and organizational pressures resulting from increased demands on services and limitations in health care resources. We estimate that surgical services expenditures in the United States will reach $170 billion in the very near future[1,2]. It seems clear that any inefficiency in the process of patient care involving surgical services could be extremely costly to individual hospitals and the nation as a whole. Likewise, the potential savings for hospitals that are not operating efficiently is enormous. Results of a preliminary study of surgical services indicate that significant increases in overall efficiency are possible at our institution.

To reduce costs and increase operating room utilization, we developed a real time communications and patient tracking system to provide a data driven method of work process management focused on patients and health care providers. A Situational Information Management System (SIMS) was developed collaboratively by the department of anesthesiology and the Artificial Intelligence in Management Laboratory of the Katz Graduate School of Business. The project objectives included academic fulfillment, improved business efficiency and cost effectiveness, improved staff morale, increased patient satisfaction, and statistical analysis of trends in utilization of surgical services. SIMS was conceived as a communications system but features automated patient and staff tracking using bar codes, utilization statistics, patient transaction receipts, and reactive and predictive scheduling.

METHODS

SIMS is an electronic bulletin board analogous to the monitors at air terminals and is capable of tracking patients from pre-surgical admission to post-surgical disposition. It is a distributed database with more than 40 fields of data functioning on a local area computer network. User interviews were conducted to determine which custom information should be displayed at each geographical location including admitting, same day surgery, holding area, operating suites, post-anesthesia recovery area, and the intensive care unit. At each location, displays were designed that mimicked lists and worksheets currently in use by health care providers at those locations.

Two types of data are displayed at each location: patient-specific data (patient demographics) copied from location to location with few changes, and site-specific data (local worksheets) edited and maintained locally. Each location has read and edit access to the local data it owns and maintains. The same location has read, but not edit privileges to similar data in other geographic locations. As patients are processed through surgical services, data ownership and editing privileges for the patient-specific data move with the patient. Ownership and edit privileges for site-specific data are retained locally. In each location, data are entered by health care providers directly caring for patients, but are available for viewing by health care providers across the surgical services network.

A peer to peer local area network was employed with read and edit privileges defined for each remote location. A distributed database was chosen with data stored locally and shared with remote sites through a coordinating server so that SIMS would be modular and robust (malfunctions are site specific while peer locations remain unaffected). We used a mouse-driven, click and drag software design in order to produce user-friendly software.

RESULTS

SIMS was written in LISP on Apple Macintosh (System 7.1). Object-oriented programming enables rapid prototyping allowing us to demonstrate our software and information displays to physicians, administrators, nurses, and ancillary personnel involved in the clinical care of patients. The prototype is used for knowledge acquisition and assists in the process of cultural change including how information management systems function in the health care environment. Utilization statistics from SIMS are used to do predictive scheduling and will assist in developing cost-based accounting systems for surgical services.

REFERENCES

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